Space Weather Forecast

Issued on Thursday 24 October 2024 at 13:29 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of isolated Moderate flares, Slight chance of further Strong flares. Chance G1/Minor Geomagnetic Storm intervals Day 3 (26 Oct).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: High with peak isolated Strong flare at 24/0357 UTC from the vicinity of a number of complex sunspot regions in southeast disc. There are currently around eleven regions on the visible disc with one region having moved beyond the western horizon over the past 24 hours. The main regions of interest are a collection of potentially complex sunspot regions close to the southeast limb. While currently difficult to assess, these are accompanied by areas of brightness and complex magnetic looping evident on SDO imagery.

A number of weak CMEs (Coronal Mass Ejections) were observed leaving the Sun, however these have all been assessed as missing Earth. The Strong flare from early on 24 Oct produced a CME that is anticipated to miss, passing behind Earth. However, Enlil modelling is underway and some Earth-directed component remains possible.

Solar Wind / Geomagnetic Activity: Solar winds showed an initial weak enhancement, attributed to the belated onset of the fast wind from the weak coronal hole. Solar wind speeds then jumped around 23/1800 UTC to peak 440 km/s, the cause of this enhancement is uncertain but may have been the result of coronal hole or glancing CME influence. The Interplanetary Magnetic Field (IMF) remained mostly weak, with brief Moderate spells. The north-south component was weak and variable in direction.

Geomagnetic activity was Quiet to Unsettled (Kp1-3), but with an Active interval 24/0600-0900 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (High energy protons) persisted at background with no Solar Radiation Storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate is expected, with a chance of isolated Moderate-class flares and a slight chance of further Strong-class flares. Source of strongest flares likely to be the complex group of regions close to the southeast limb. A new or returning region is expected to rotate onto the disc during Days 1-2 (24-25 Oct), otherwise no significant arrivals or departures are expected during the period.

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Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs currently expected. Background winds expected until enhancement from a stream of coronal hole fast winds. Onset likely Day 3 (26 Oct) or possibly Day 4 (27 Oct), with slightly elevated to elevated winds likely. Winds then easing later Day 4.

Geomagnetic activity is forecast to be Quiet to Unsettled, easing to many Quiet Day 2 (25 Oct). Any further fast wind enhancement will bring a spell of Unsettled to Active activity (Kp 3-4), with a slight chance of G1/Minor Storm intervals (Kp 5) Days 3-4 (26-27 Oct). The low confidence influence of any glancing blows from CME arrivals during Day 3 sees a rise in probability of G1/Minor Geomagnetic Storming.

Energetic Particles / Solar Radiation: The count rate of energetic particles (High energy protons) is forecast to persist at background with no Solar Radiation Storms currently expected.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	5	20	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	No	60	60	60	60
Very Active	R3-R5 (X Class)	No	10	10	10	10

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	1	1	2	5
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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